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A two-color terawatt laser system for high-intensity laser-plasma experiments[1] JAMES SANDERS, RAFAL ZGADZAJ, MICHAEL DOWNER, University of Texas at Austin — In some high-field laser-plasma experiments, it is advantageous to accompany the main high-energy (∼1 J) laser with a second high-energy pulse (∼0.1 J) which has been frequency-shifted by ∼10%. Such a pulse-pair would have a low walk-off velocity while remaining spectrally distinct for use in two-color pump-probe experiments. Moreover, by shifting the second pulse by ∼plasma frequency, it is theoretically possible to enhance or suppress relativistic self-focusing, which is the first (uncontrolled) step in many laser-plasma experiments. We report a hybrid chirped pulse Raman amplifier (CPRA)/Ti-Sapphire amplifier (>200 mJ, 15-20 nm bandwidth (FWHM), >60 fs duration) that is capable of performing such two-color high-field experiments. When amplified and compressed, this beam's power exceeds 1 TW. This two-color capability can be added to any commercial terawatt laser system without compromising the energy, duration or beam quality of the main system. We will report progress with a two-color seeded relativistic self-phase modulation experiment.

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